

NANOWIRE VARACTOR DIODE AND METHODS OF MAKING SAME

Abstract

A nanowire varactor diode and methods of making the same are disclosed. The structure comprises a coaxial capacitor running the length of the semiconductor nanowire. In one embodiment, a semiconductor nanowire of a first conductivity type is deposited on a substrate. An insulator is formed on at least a portion of the nanowire's surface. A region of the nanowire is doped with a second conductivity type material. A first electrical contact is formed on at least part of the insulator and the doped region. A second electrical contact is formed on a non-doped portion of the nanowire. During operation, the conductivity type at the surface of the nanowire inverts and a depletion region is formed upon application of a voltage to the first and second electrical contacts. The varactor diode thereby exhibits variable capacitance as a function of the applied voltage.

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